UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FRANK JANSEN

Appeal 2007-0405
Application 10/712,495
Technology Center 1700

Decided: May 31, 2007

Before EDWARD C. KIMLIN, CATHERINE Q. TIMM, and JEFFREY T. SMITH, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 11-20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

I. BACKGROUND

The invention relates to a method of delivering precursor gas to a process reactor chamber. The method is used in the context of atomic layer deposition (ALD), a process of depositing very thin films onto a surface such as a wafer (Specification ¶ 2). In the gas delivery method, precursor gas flows from auxiliary chambers to an inlet of a process reactor solely under a pressure gradient. Claim 11 is illustrative of the subject matter on appeal:

11. A method of delivering precursor gas comprising:

closing a first precursor gas valve located in between a first auxiliary chamber and an inlet of a process reactor chamber,

closing a second precursor gas valve located in between a second auxiliary chamber and an inlet of the process reactor chamber,

reducing the pressure in the process reactor chamber,

opening the first precursor gas valve,

allowing a first precursor gas to flow from the first auxiliary chamber to an inlet of the process reactor chamber solely under a pressure gradient,

closing the first precursor gas valve,

reducing the pressure in the process reactor chamber,

opening the second precursor gas valve,

allowing a second precursor gas to flow from the second auxiliary chamber to an inlet of the process reactor chamber solely under a pressure gradient, and closing the second precursor gas valve.

The Examiner relies on the following prior art references to show unpatentability:

Kang	US 6,287,965 B1	Sep. 11, 2001
Satta	US 6,391,785 B1	May 21, 2002
Sneh	US 2003/0180458 A1	Sep. 25, 2003

The rejections as presented by the Examiner are as follows:

1. Claims 11-17 are rejected under 35 U.S.C. § 102(e) as anticipated by Sneh;
2. Claims 18 and 19 are rejected under 35 U.S.C. § 103(a) as unpatentable over Satta in view of Sneh; and
3. Claim 20 is rejected under 35 U.S.C § 103(a) as unpatentable over Sneh in view of Kang.

II. DISCUSSION

We are in full agreement with the Examiner that the claimed subject matter is described by the applied references within the meaning of § 102.

Appellant's sole contention in this appeal is that "[c]ontrary to the Examiner's allegations, Sneh does not teach or suggest an ALD method wherein precursor gas flows from auxiliary chambers to an inlet of the process chamber solely under a pressure gradient as required by the present invention (see claim 11)." (Br. 10). According to Appellant, Sneh describes a complex "Synchronous Modulation of Flow and Draw (SMFD)" process creating gas flow using booster chambers, a gas distribution chamber, a draw control chamber, a pump, and numerous flow restrictors (FREs) and valves rather than a process in which gas flows solely under a pressure gradient (Br.

10-12). Appellant relies upon this argument to rebut each of the rejections on appeal (Br. 13-14).

The Examiner responds that the claims do not exclude the chambers, pumps, flow restrictors and valves of Sneh. According to the Examiner, claim 11 is broad enough to encompass the inclusion of those elements (Answer 6).

As the claims are argued as a group, we select claim 11 to represent the issues on appeal. The overarching issue is: Does Sneh describe a method of delivering precursor gas that allows precursor gas to flow from the auxiliary chambers to the inlet of the process reactor chamber solely under a pressure gradient as required by claim 11? All of the rejections stand or fall based on the answer to this question.

To resolve the appeal we must first consider what "flow . . . solely under a pressure gradient" means in the context of claim 11. There is no dispute that the Specification does not give "flow . . . solely under a pressure gradient" any special meaning by way of definition or otherwise (Specification ¶ 1, 9, 15, 18; Br. 11; Answer 6). Appellant states that the present invention uses the term pressure gradient "in the normal and understood manner, meaning a movement caused by a differential in pressure between two different areas." (Br. 11). In order for fluid flow to take place in any process, there must be a pressure gradient. As put by the Examiner, "if there is gas flow, there is a pressure differential." (Answer 6). Pumps, chambers, flow restrictors, etc. create and/or affect pressure gradients, but the movement is still due to the underlying pressure gradient created. Therefore, claim 11 does not exclude the presence of pumps,

chambers, flow restrictors, etc., the flow still being solely under a pressure gradient.

We cannot say that the language used in claim 11 patentably distinguishes the process of the claim from the process of Sneh.

Sneh describes a process in which an initial transient flow rate is generated by chemical-gas flow from booster 107 (Sneh ¶ 89, ll. 1-6; Fig. 1). When the valve between the booster chamber and deposition chamber (valve 110) is opened the gas flows from booster chamber 107 through gas distribution chamber (showerhead) 104 and flow restrictors 109 and 113 to deposition chamber 114 in an initial pulse that gradually decreases to a steady-state flow rate (Sneh ¶ 89, ll. 6-24; Fig. 1). At the same time, gas is drawn out of the deposition chamber 114 through draw control chamber 116 (Sneh ¶¶ 46 and 89; Fig. 1). In order for flow to occur between the booster chamber 107 and the deposition chamber 114, there must be a pressure gradient.

Appellant creates a pressure gradient between two areas, the auxiliary chamber and the reaction chamber, by supplying gas to an auxiliary chamber and pumping out gas within the reaction chamber so a higher pressure of gas is contained in the auxiliary chamber than in the evacuated reaction chamber (Specification ¶ 15; e.g., Fig. 1(b) valve 24). Booster 107 (Fig. 1) of Sneh serves as the higher pressure area just as the auxiliary chamber of Appellant serves as the higher pressure area in the claimed process. Deposition chamber 114 (Fig. 1) of Sneh serves as the low pressure area just as the reaction chamber of Appellant serves as the low pressure area. Gas flows due to a pressure gradient in both processes when the valve between the high and low pressure areas is opened (Sneh, ¶ 46, e.g., Fig. 1 valve 110).

A preponderance of the evidence supports the Examiner's finding that Sneh describes a method of delivering precursor gas to a reactor chamber that allows precursor gas to flow from the auxiliary chambers to the inlet of the process reactor chamber solely under a pressure gradient as required by claim 11. Claim 11 is broad enough to read on what is taught by Sneh. *See Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983) ("The law of anticipation does not require that the reference 'teach' what the subject patent teaches. Assuming that a reference is properly 'prior art,' it is only necessary that the claims under attack, as construed by the court, 'read on' something disclosed in the reference, i.e., all limitations of the claim are found in the reference, or 'fully met' by it.").

As Appellant has not convinced us of a reversible error in the rejection under 35 U.S.C. § 102(b), we sustain that rejection.

As the Examiner applies Sneh in the same manner in support of the 35 U.S.C. § 103(a) rejections and Appellant presents no further contentions directed to the § 103(a) rejections, we sustain those rejections based on the analysis discussed above.

IV. DECISION

With regard to the decision of the Examiner to reject claims 11-17 under 35 U.S.C. § 102(e) and claims 18-20 under 35 U.S.C. § 103(a), we AFFIRM.

V. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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